



Governing Energy Transitions: strategic challenges of local utility companies in the Swiss energy transition

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Editorial Introduction by the Guest Editor

Many countries are currently firmly committing to a transition towards a more sustainable energy system, each facing their own unique challenges. The Swiss energy transition is particularly challenging due to a combination of commitments: (1) a gradual phase-out of nuclear energy, currently about a third of the country's electricity production, is expected by 2034, (2) construction of new renewable energy sources such as solar PV, wind and micro-hydro, (3) electrification of heating and transportation, (4) energy saving, and (5) stringent CO2 emission targets.

Utility companies play an important role in the realization of the Swiss energy transition, but are also facing numerous strategic challenges as a consequence of a rapidly changing playing field. The commitments necessary to transition towards a more sustainable energy system are not necessarily aligned with the current operations of local utility companies. For example, the lack of incentives for energy efficiency programs, market opening, smart grids and renewable energy has utilities looking for new business models.

This issue of Network Industries Quarterly (NIQ) is linked to the Certificate of Advanced Studies (CAS) in Governing Energy Transitions, a continuing education program organized by the Chair Management of Network Industries at the École Polytechnique Fédérale de Lausanne (EPFL). The program has a strong practical component, embedded in an academic framework of multi-level governance. Participants of the program were invited to contribute to this issue, sharing their insights on the strategic challenges of local utility companies in the Swiss energy transition.

The following are the themes included in this issue of NIQ:

- An overview of strategic responses of urban utility companies to the energy transition: comparing Swiss and German utilities.
- Implementation of a local demand-side management program in Switzerland.
- An international perspective on demand-side management programs, and policy-recommendations for a Swiss governance model.
- A broader identification of new business opportunities for utility companies, arising from the ongoing energy transition.

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“A particular species” urban utility companies in Germany and Switzerland

Susan Mühlemeier*

This article presents the characteristics of urban utility companies in Germany and Switzerland and examines their challenges and strategic actions in the context of energy transition. In so doing, it explores a particular actor type in a communal infrastructure service organisation.

Introduction

Urban utility companies represent a particular actor type in the German and Swiss energy sector. Due to the federal organisation of these two countries, the cities traditionally have the legal and financial autonomy to organise their infrastructure services – electricity, gas, water, public transport, telecommunication, waste – on the communal level¹. For this purpose, cities run their own utility companies which provide a varying breadth of infrastructures to a city. As such, they are communal firms and at the same time large companies² [“They function like large corporations. If you look at their turnover, they are large corporations. However, through their communal structure they are still also very

To approach this particular actor type, the article provides an overview on characteristics of the UUC in Germany and Switzerland and their current situation, by examining their challenges and strategic actions in an indicative manner.

Methodically, this article is based on an explorative expert interview series, focussing on the energy division of some of the biggest UUC in Germany and Switzerland (by turnover): Munich, Cologne, Hannover and Zürich, Geneva, Basel and Bern. In 2017, 40 experts as well as the CEOs and members of the UUC strategy units were interviewed – including CEOs of middle-sized UUC for a more complete picture (Table 1).

	Large UUC	Middle-sized UUC	Research	Consultancies, service provider	Sectoral association	Environmental association	Politics
GER	4	1	5	7	2	1	
CH	4	3	4	4	3		1

Table 1. Overview on interviewees per country and group
Source: Author’s elaboration

bureaucratic and political” DE2]³. Thus, the urban utility companies (UUC) are key players in the national energy sectors in Germany and Switzerland and play an important role for its transition. At the same time, they present an interesting example of how large cities (self-) organise their infrastructure services on a communal level in the context of the energy transition, which is yet rarely considered in scholarly and public debates.

In a one-hour semi-structured interview, the experts were asked about their personal perspective on structural and cultural characteristics of the UUC; current political, economic, technological and organisational challenges as well as the strategic actions of the UUC to face these challenges. The interviews were transcribed and analysed through a semi-structured coding process in MAXQDA: Under the predefined codes “characteristics”, “challenges” and “strategic actions”, the statements were grouped according to categories, emerging from the interviews.

1 This also holds true for the Austrian energy sector, however, this study only focusses on the Swiss and German case.

2 In their energy division they belong to the biggest energy suppliers in both countries (StromMagazin n.d.).

3 Original Language of the interview quotes is German and French. They have been translated and anonymised by the author. DE stands for interviewees from Germany. CH stands for interviewees from Switzerland

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Characteristics: public enterprises in federalist states operating network infrastructures

The key task of the UUC in Germany and Switzerland is the provision of infrastructure services to “their” city. Depending on the individual city, the organisational form of these infrastructure services varies: most of the UUC cover energy and water services and sometimes the fibre-optic grid within one firm. Transport, waste and sometimes public housing are organised in “sister”-firms which are owned by the city (varying horizontal integration). As in any company, the horizontal integration plays an important role for risk allocation and diversification opportunities.

Regarding the legal form of the UUC, there is a major difference between Germany and Switzerland. While in Germany the UUC are independent firms under private law, in Switzerland most of the UUC are independent firms under public law (Basel, Bern, Geneva) – only Zurich is an exception, where the gas supply is organised in a corporation under private law, but the electricity and telecommunication services are still part of the city administration. Among the interviewees, there was disagreement, whether the legal form of the UUC influences their entrepreneurial opportunities. [“The legal form is not so decisive; it is more about the personalities. As long as the administrative board influences the firm’s strategy, there is control.” DE8; “every legal form has its means” DE6; “the legal form makes the difference. It influences the flexibility, the financial resources, the mind-set, the profit orientation” CH16].

Despite the enormous variety among the UUC, all interviewees agreed on two aspects, which make UUC unique: they are multi-utility (provide several types of infrastructure services) and multi-energy companies (supply several types of energy) (Figure 1). This differentiates them from large energy providers like RWE or EON, but also from [“regional providers like Romande Energie or Groupe E in Switzerland, who are mainly active in electricity” CH 8].

Another common characteristic is their vertical integration [“From the plant to the socket, they can cover all” CH16]. The UUC are typically fully integrated firms, producing and trading electricity, gas and water but also owning and operating the distribution grids for electricity, gas, water and sometimes district heating, respectively public transport and telecommunication. They also directly supply a broad range of customers and offer a broad range of energy related services. As such, they are at the same time monopoly and market actors. The grid operation is a natural monopoly - production, trade and retail, however, can be organised through markets. There are again two important differences between Germany and Switzerland. While German UUC are fully embedded in the European market

and operate their grid “unbundled” from production and retail, the unbundling regulation does not apply for the Swiss UUC and so they cover the distribution grid operation, production, trade and retail all together in one firm. Additionally, Swiss UUC still have a monopoly in gas and electricity supply for households in their local territory, since the Swiss electricity market is only partly liberalised (for large consumers – more than 100.000 kwh/a).⁴

Another distinct characteristic of the UUC in both countries is the public ownership of the city while being corporatized firms. Consequently, they are expected to act according to the public interest and fulfil public service tasks for the urban system. At the same time, they should make profit for the city administration, in order for the city to finance non-profit services. The particular situation of the UUCs makes it, that the city does not only encounter them as their owner (shareholder), but also in different roles as political representative of the cities’ citizens (stakeholder). In Germany, the public service task for the UUC is focussed on the monopoly, which means the provision of equitable access, quality and prices for the network infrastructure services to the citizens, which are financed through taxes and fees. For the supply of energy, however, the guarantee of the public service is within the national responsibility of the regulator, the Bundesnetzagentur. In Switzerland, the public service is (still) the city’s responsibility and due to the monopoly for household supply also holds true for part of the retail, such that the cities define the “equitable price” for electricity and gas for their citizens. Moreover, being non-unbundled, the Swiss UUC can

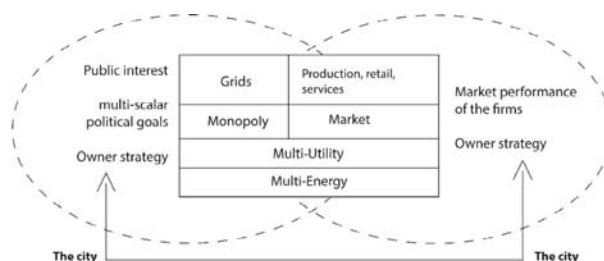


Figure 1. Overview on characteristics of UUC

Source: Author’s elaboration

cross-finance their different infrastructure services [“The non-separation in grid and production facilitates that the retail losses due to efficiency can be compensated by the grid revenues” DE14]. They ensure the public service of all infrastructures for the city on the city level.

⁴ Switzerland is not a political member of the EU and thus does not need to implement the EU unbundling and liberalisation regulation. However, this particular Swiss situation is part of the current bilateral negotiations among the EU and Switzerland and might change in a near future.

Challenges

Global challenges

For a long time, the energy sector in Germany and Switzerland used to be very stable and static regarding both, production and distribution technologies as well as the overall regulatory frame. However, for the last 20 years, successively, three large change processes were ongoing. First, the political integration in Europe which caused liberalisation and subsequent re-regulation of the energy, and respectively the electricity sector. Today, the created markets still need to be designed and re-regulated [“Five years ago energy market design was not even a term in the discourse, so this shows how things change” DE8]. The UUC encounter more and more diverse competition [“Start-ups, energy retail platforms (e.g. verivox) but also Google, Telecom, actors who are able to deal with data” DE9] as well as more individualised customer demands. Second, the political goal change on energy production technologies: decarbonising energy supply and phasing out nuclear power plants (energy transition). Subsequently, Germany, as many other European countries, launched subsidiary schemes for renewable technologies, which caused a decisive increase in decentral production capacity, volatility of supply and bi-directionality in the electricity grids, decreasing electricity prices as well as an enormous increase in actors involved in the sector. Third, the general trend of digitalisation and “smartness” in the energy sector. The decisive acceleration in information exchange changes not only energy trading and retail but also provides new grid monitoring and management opportunities, with which the UUC need to catch-up. These three global changes cause at the same time a regulatory openness and speed of regulatory change, which the sector did not encounter before as well as a fundamental technology change in decentral production, storage and grid management.

All traditional energy companies face these fundamental challenges, however, the UUC are also confronted with some particular challenges, which are related to their characteristics presented above.

Particular challenges

The two major trends of liberalisation and political goal change for a more sustainable energy supply system (energy transition) cause contradicting expectations for the UUC, which are of particular relevance due to their public ownership (see figure 1). [“Cities are more than just owners, they are stakeholders – they have political expectations and they are in a double-role: owner and political actor, so they claim political goals as owner” DE10; “earning money is the main expectation from the politics. Of course, they

always say please think also about the energy transition but still the main claim is, it needs to be profitable” DE18]. In comparison to private energy companies, where the political goals and the societal interest are external to the company, in UUC the political goals are often directly formulated in the owner strategy and goals and can contradict the economic interests. Furthermore, in the federalist states, the UUC are located in the communal political level and so they encounter several levels of political interest – communal, cantonal/Länder, national and European interest at the same time. And the political goals can vary a lot among the levels as well as among the different cities, which additionally complicates the situation of the UUC.

In both countries, the clash of public and private (economic) interest is also reflected in controversial opinions on which profiles and competences should be included in the administrative board of the UUC. The public interest argues for a democratic representation of the citizens, the private interest argues for entrepreneurial, and sometimes for technological expertise. Consequently, the composition of the administrative board varies among the cities in both countries and causes additional challenges in the management of an urban utility company [“Who is sitting in the administrative board of UUC? Local politicians.” DE3; “In the administrative board it depends, who are the politicians? Experts in the energy field or in politics or more knowledgeable citizen?” DE12].

The global challenges mentioned above also require a decisive change in the firm culture, as well as in the individual profiles and competences of the employees in all areas. Entrepreneurship, risk affinity and innovation capacity, acceleration of decision making processes, competences in marketing, customer relations, new ways of management and working modes as well as new competences in smart technologies are required. The UUC used to be characterised by an administrative and engineering mind-set and culture which allowed them to provide the public services and manage the cities infrastructure systems [“UUC are characterised by a particular type of employee. An engineer who is focussed on technology while thinking in social dimensions. He is not primarily interested in profit for the UUC but in facilitating the life of the city” DE16]. This mind-set changes slowly, but still the UUC are expected to fulfil these public services in a constant and reliable manner. At the same time, they should also perform as successful companies in uncertain and volatile market conditions. Thus, one of their major challenges is the incorporation of all necessary competences and the implementation of an organisational change with a constant public and private performance.

A second major field of challenges is related to the mismatch among the regulations caused by the liberalisation (e.g. unbundling) and the technological requirements of production technologies for renewable energies – especially for the UUC in Germany. In order for the utility companies to include and manage decentral, dispersed and volatile renewable production, storage technology and flexibility mechanisms are central tools to ensure the supply security. Questions of whether production or storage capacity for balancing the grid is financed under the monopoly or market scheme still need to be regulated. [“Integrated resource planning is really complicated with unbundling – even when there are contracts of data exchange. The classical full integrated firm could decide: do we want to install LED or do we want to build a new plant” CH10]. On a more general level, the regulatory frame for liberalisation and the regulatory frame for the Energiewende (energy transition) are partly contradictory and thus cause challenges for the strategic orientation and investment decisions of the UUC. [“The whole unbundling regulation was made before the energy transition and the digitalisation and it hinders it right now. The utility companies get no feedback on the needs and the reaction of the customers – this is still designed for the uni-directional system and need to be revised in the future” DE3; “if somebody has the responsibility, he should also have the possibility to interfere” DE12].

Strategic actions: adapt to the market logics and valorise particular characteristics

In the context of the vast array of challenges, the UUC strategic actions in both countries can be grouped in two areas: the adaptation to market logics by taking over strategic behaviour from private industry and the strategic utilisation of their particular characteristics.

Adapt to market logics

Although the liberalisation in Germany is already further advanced, interviewees in both countries mentioned a recent strategy refinement and subsequent organisational and cultural changes as main strategic actions in the context of liberalisation. Interviewees mentioned the implementation of innovation process management as well as the establishment of an innovation culture, including new profiles and competences in the firm as well as establishing new management cultures and working modes [“Recently an employee of an UUC told me, that she does not have business cards anymore, because she does not want to order new ones every year. She prefers to wait until she knows, in which department of the firm she will finally be located” DE16; “You design quicker products, innovation

circles and beta versions, which are improved on the go” CH3]. Topics like customer orientation, increasing cost efficiency the exploration of new business models – close or more distant to their core business area, the design of new products in retail and services as well as the investment in renewable production capacities beyond their city territory, were mentioned in almost every interview in both countries [“Reduce the costs and look for new business opportunities are the main two topics, we have” DE2; “... but there is not yet an UUC which has a completely new business model” DE17].

For this purpose, the UUC in both countries buy IT and engineering firms, which allow them to incorporate the necessary competences. Moreover, they also cooperate with established and new players from other industries (IT, telecommunication, car manufacturers), especially for new business model development [“If you can’t beat them, join them” DE14]. The UUC in Germany additionally emphasised the increasing importance of the cooperation with other UUC (inter-city cooperation) but also with the “sister” firms in the same city (intra-city cooperation). [“We want to create ‘experience worlds’ for our customers – plus-offers based on digitalisation, e.g. bundling e-mobility and smart home, therefore cooperation with our communal sister” DE10].

Utilise particular characteristics

While the UUC in both countries adapt to the market logics and take over strategies from private industry, they also strategically use their characteristics of being network infrastructure providers and multi-utility and multi-energy companies. On the one hand they strengthen their monopoly position and invest in grid concessions, respectively invest in new grid infrastructure like fibre optic grids and district heating grids [“They all do fibre optic, which is infrastructure and close to the core business” DE12; “The new business areas are heat and telecommunication – therefore they invest in district heating and fibre optic grid” CH17]. On the other hand, they invest in grid convergence through combined heat power plants in district heating networks or power-to-X solutions by using their gas grid infrastructure. Based on these investments, especially the German UUC offer new supply package products and technology management packages for prosumers, city districts, large buildings and companies. [“There should be a modular design of products – packages where the customer can add and delete parts ... as much as possible we want to offer ourselves – to get the most out of it. And before amazon starts to sell electricity, we want to sell services” DE10].

They also explore options for sector coupling by cooperating with their “sister”-firms or subsidiaries in telecommunication and public transport. Based on their diverse infrastructure assets, they try to diversify their products to ensure the revenue stream and economic performance, at the same time they also use the diversification to improve their system management functions and ensure their public service performance. [“Sector coupling is an opportunity, we have all the grids and can jointly optimise it.” DE10].

Furthermore, in both countries the UUC also build on their particular characteristic of being locally embedded public enterprises, pushing for their interests through their political representatives, in addition to being part of sector associations (e.g. Swisspower, VSE in Switzerland or 8KU, VKU Germany) and individual lobbying on the national and European levels. Only in Switzerland, the interviewees explicitly mentioned cooperating with local politicians and citizens [“Local parliament and local society are the daily and first partners, which they aim at first” CH4]. In both countries, the stakeholder involvement and close collaboration with “their citizens” was emphasised to strengthen the customer relation and improve the innovation management. [“We collaborate with our customers and do design thinking workshops to develop pilot products, try things out, experiment and become quicker” CH3].

Overall, the UUC in both countries face similar challenges and thus some of the strategic actions are similar. However, the large strategic lines differ. The UUC in Germany focus actively on economic growth strategies and push for the further implementation of the Energiewende [“we can grow. We need to look beyond the region for making our business” DE9]. At the same time, they emphasised the re-orientation towards the commune and the local level, aiming for a network builder role in their “traditional territory” [“To cooperate still in a good way with the city and the communal structure to position themselves as infrastructure service provider in the communal environment and remain visible” DE11]. The UUC in Switzerland, however, strategically aimed at becoming quicker and more flexible and at engaging more in “do-it-yourself” strategies. [“Try to establish agility, to enable change while respecting the tradition, reliability and long-term orientation, which can be an asset in the digital age” CH11]. Additionally, some of the Swiss interviewees stressed that the UUC engage in “double-side” strategies pro and contra the national energy transition strategy [“From the civil society, they are seen as a strong actor for the energy transition, but at the same time, they need to get their business done and ensure their profits in the future - so there are two heads in the companies” CH19].

Discussion: typical challenges of public enterprises in network industries

The results presented above mirror the particular situation of the UUC in Germany and Switzerland. However, they also reflect some of the major issues discussed in scholarly literature on public enterprises and network industries.

The political control is a key challenge for the UUC as public companies. Contradictory ‘public’ and ‘private goals’ in the owner strategies or the disagreement on the competences needed in the administrative board, reflect the problem of how to ensure and design the public control on the company. In scholarly literature on public corporate governance (Schedler et al. 2011; Schedler & Finger 2008), the so called principal-agent theory is often cited to explain this problem. The theory describes the problematic, that the owner (principal) is not the operator of the firm (agent) and thus lacks information on its performance. Consequently, the principal tries to establish different control mechanisms (e.g. political representatives in the administrative board) to overcome this gap. This can restrain the entrepreneurial activities, and it is an important challenge in (public) corporate governance to balance the (entrepreneurial) freedom and the (democratic) control.

Furthermore, the particular UUC challenge of operating infrastructure networks, producing and supplying energy in a liberalised scheme, plus the political decision to push for a “decarbonising” technology change, reflect two typical problems of network industries: first, discussions on liberalisation and the subsequent re-regulation of network industries, second, the problem of lacking coherence among the current regulatory framework and the technological development(s). In a scholarly literature these two topics are widely discussed (Finger et al. 2005; Finger & Jaag 2015; Finger & Künneke 2011; Florio 2017) and are also relevant to other network industries, like the railway sector. However, the problem, that the regulatory frame caused by liberalisation hampers the actions needed to foster technology change towards a more sustainable energy supply system, is a particular debate in the energy sector and here latest, Germany and Switzerland, could profit a lot from the others experiences.

To sum up, the UUC are indeed particular actors, however, they represent an interesting case of urban self-organisation of infrastructure services in federalist states and question the common liberalisation paradigm, which could be interesting from an international perspective and should be subject to further research.

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